19. On a Remnant of the Omphalo-mesenteric Arteries in the Manatee. By K. Kostanecki, M.D., LL.D., F.Ac.Sc. Cracow *.

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(Text-figure 1.)

In a paper published in 1897 in the Proceedings of the Zoological Society (Notes upon the Anatomy of a Manatee, *Manatus inunguis*), Beddard describes and represents in a drawing the cæcum of this animal. The general shape of the cæcum is precisely like that of the other species of Manatee, especially of *Manatus latirostris*, one specimen of which Beddard has also examined, and which previously had been described by Murie †. Beddard adds: "I should not have had the drawing prepared were it not for a peculiar fold of mesentery which it is the main purpose of that sketch to illustrate. This fold, which is not referred to by Dr. Murie, lies on either side of the mesentery supporting the ileum and runs nearly to the cæcum. It does not bear a blood-vessel, and the fold of either side is continuous with its fellow by a complete bridge over the front side of the ileum as indicated in the sketch. Both species are precisely alike in the presence and in the relations of these two mesenteries." (The drawing in Beddard's paper is also reproduced in Weber's 'Säugetiere.')

Neither Beddard nor Weber gives an explanation of this fold.

I have had the opportunity of examining a Manatee fœtus (*Manatus inunguis*) 35 cm. in length in the collections of the Royal Museum of Natural History at Brussels, thanks to the kindness of Prof. Dollo.

The cæcum presented the aspect known in the adult animals from the papers of Cuvier, Owen, Home, Murie, Flower, Rapp, Huntington, Beddard, Waldeyer, and others.

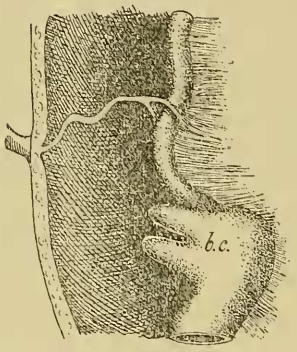
I noticed immediately a few cms. away from the cæcum the bilateral folds described by Beddard, which ran from the dorsal mesentery to the wall of the ileum, uniting on its ventral, antimesenteric wall. However, they did not terminate there in a narrow bridge, as in Beddard's drawing, but the central part was markedly elevated above the surface of the ileum, and was elongated into a narrow strip stretching towards the umbilicus and terminating there (as can be seen in the text-figure, p. 274).

* Communicated by The Secretary.

† Murie, "On the Form and Structure of the Manatee," Trans. Zool. Soc. viii. p. 127.

The connection of these folds with the umbilicus furnishes an immediate explanation of the condition in the adult animal described by Beddard. Without any doubt, we have before us a remnant of the involution of the vitelline duct and its blood-vessels, especially its arteries. I have not been able to dissect the precious specimen and make microscopical sections, but examining the strip and its relation to the ileum, I noticed that the wall of the ileum between these folds was smooth; the vitelline duct had completely disappeared, and blood-vessels were not apparent under the peritoneum forming these folds; it may be that microscopical sections would have disclosed degenerated remains of the walls of these vessels. In spite of that, there can be no doubt, considering the course of this strip, that it owes its existence to structures connected with the yolk-sac apparatus.

Text-figure 1.



Cæcum and umbilicus of Manatee.

b.c.=bifid cæcum.

Especially regarding the symmetrical origin of the two folds from the dorsal mesentery of the terminal portion of the ileum, there can be no doubt that these are produced by the omphalo-mesenteric arteries. The omphalo-mesenteric or vitelline vein or its remains cannot play any part here; in fœtal life it runs differently, namely, from the umbilicus to the mesoduodenum. In the fœtus which I have examined it had vanished completely.

The changes of the omphalo-mesenteric arteries are described by several authors, especially in the very exact paper by Broman*, who, together with the results of previous researches, gives many new data.

It is known that the omphalo-mesenteric arteries are originally paired and run on either side of the ileum to the umbilicus, then unite, both in the part which runs through the mesentery,

* Broman, "Über das Schicksal der Vasa vitellina bei den Säugetieren," Ergebnisse der Anatomie und Entwickelungsgeschichte, Bd. xxi. (1913).

forming one arteria omphalo-mesenterica, the future superior mesenteric artery, and in the part where, ventrally to the ileum, they run towards the umbilicus; Broman calls this last part—which runs outside of the gut together with the vitelline duct, towards the umbilicus and in the umbilical cord—the vitelline artery.

In some animals the arteriæ omphalo-mesentericæ, though not paired in their proximal and distal parts, remain for some time paired in the part which runs on both sides of the ileum, thus forming a ring around the ileum, which, starting dorsally from the single arteria omphalo-mesenterica, passes on the ventral side of the ileum into the single arteria vitellina, which runs toward the umbilicus in the mesodermic vitelline stalk.

In most animals this part does not remain paired, the artery on one side disappearing (the left in some animals, in others the right), the persisting artery of the other side running on the lateral surface of the ileum, but deviating from its wall, so as to produce a peritoneal fold; usually this fold later on loses its connection with the wall of the ileum and thus, as the beginning of the arteria vitellina, passes on the mesoileum.

When after the disappearance of the vitelline duct, the vitelline artery also disappears, the mesodermal yolk-sac-stalk grows thinner and thinner, ruptures, and finally vanishes.

Broman in the paper I have cited proves that during this process we meet with variable conditions in different animals. Thus, in some animals until birth the vasa omphalo-mesenterica can remain visible always, in others abnormally; but usually they disappear in the fœtus, and leave behind them folds, running towards the umbilicus, which persist in some animals only for a short period of their fœtal life, in others until birth and sometimes even in extra-uterine life in the adult animal. These folds, running towards the umbilicus, rupture, and either vanish completely or (either only in fœtus or new-born or adult animals) form bands adherent to the dorsal mesentery, but hanging freely down into the abdominal cavity.

The remains of the vitelline vein which run towards the mesoduodenum, Broman calls "appendix mesoduodeni," the remains of the vitelline artery "appendix mesilei"; any part of the ruptured yolk-duct-stalk remaining near the umbilicus, "appendix umbilicalis."

Broman noticed in an adult *Castor fiber* in the place where in other new-born animals, or their fœtuses, could be seen the appendix mesilei, a remarkable fold, running from one side of the mesileum to the wall of the ileum; he explains it as the remains of the fold, formed by the artery joining the omphalo-mesenteric artery in the mesileum and the arteria vitellina in the yolk-sac-stalk by separating from the wall of the ileum.

I see in this case of *Castor fiber* a complete analogy with the condition in the Manatee, except that in the Manatee, in the place of the appendix mesilei of other animals, such a fold appears on

both sides. This shows that in the Manatee the paired parts of the vitelline arteries, which enclose on both sides the ileum, must have persisted for a longer time than in other animals, and, deviating symmetrically from the wall of the ileum, must have formed symmetrical peritoneal folds. As in *Castor fiber* the one-sided fold, so here the paired folds persisted in the adult animal.

The fact, that those paired folds meet on the ventral wall of the ileum, forming a sort of bridge, appears quite natural, considering that the omphalo-mesenteric arteries joined on the ventral wall of the ileum and from there ran toward the umbilicus in the yolk-sac-stalk, which in the fœtus which I examined was still preserved.